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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/791,853	03/04/2004	Ryo Takeshita	US-163	5567
38108	7590	11/20/2007	EXAMINER	
CERMAK & KENEALY LLP ACS LLC 515 EAST BRADDOCK ROAD SUITE B ALEXANDRIA, VA 22314			MARX, IRENE	
			ART UNIT	PAPER NUMBER
			1651	
			MAIL DATE	DELIVERY MODE
			11/20/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/791,853	Applicant(s) TAKESHITA ET AL.	
	Examiner Irene Marx	Art Unit 1651	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10/3/07.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 8-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 8-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|-----------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input checked="" type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

The amendment filed 10/3/07 is acknowledged. Claims 1, and 8-10 are being considered on the merits.

Claim Objections

Claim 4 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

Claim Rejections - 35 USC § 103

Claims 1 and 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lloyd *et al.* taken with Stainthorpe *et al.* and West *et al.*

Lloyd *et al.*, disclose the bioconversion of methane to methanol with a processed product obtained from *M. trichosporium* (See, e.g., page 461, paragraph 1) and also disclose that the genes encoding for soluble methane mono-oxygenase have been cloned and sequenced. See, e.g., page 462, paragraph 4. In addition, the reference teaches a method of culturing mutant strains of *M. trichosporium* which have lost the ability to inherently use an alkane (page 466, paragraph 1) and which have been transformed with soluble methane monooxygenase genes such that the recombinant microorganisms become capable of using an alkane such a methane (page 465, last paragraph). That the transformed microorganisms make at least some methanol can be presumed from the disclosure at page 461, from which it is clear that at least some of the methane used is biotransformed to produce at least some methanol.

The reference differs from the invention as claimed in that it does not disclose the production of an alcohol such as methanol wherein the microorganism expresses the soluble-type MMO is *Escherichia coli*, for example. However, West *et al.* disclose the expression of *E. coli* of methane monooxygenase genes. In addition, Stainthorpe *et al.* discusses the genetic composition of the mono-oxygenase from *Methylococcus capsulatus*.

Accordingly, one of ordinary skill in the art would have had a reasonable expectation of success in transforming *Escherichia coli* with the genes obtained from strains of a

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Methylococcus capsulatus strain and expressing the genes for the production of an alcohol from an alkane by using a processed product of the microorganism containing the enzymes of interest.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the claimed invention was made to modify the process of Lloyd *et al.* by using a transformed strain of *Escherichia coli* or a processed product thereof as taught by West *et al.* for the expected benefits of reducing the concentrations of atmospheric methane by producing methanol from methane in an economic and efficient manner.

Thus, the claimed invention as a whole was clearly *prima facie* obvious, especially in the absence of evidence to the contrary.

Response to Arguments

Applicant's arguments have been fully considered but they are not deemed to be persuasive.

Applicant argues that claimed process distinguishes over the references because the culturing temperature for *E. coli* in the instant process is set at 20-30°C. It is noted with all due respect that at least West *et al.* cultures *E. coli* K38 at 30° C. (See, e.g., page 1302, col. 1 (Methods)). In addition, the claims as written fail to provide a clear indication as to culturing conditions such as media provided. It is doubted that *E. coli* is resistant to all alkanes and capable of bioconversion of large alkanes even at 30° C. Only in claim 9 is the specific alkane to be bioconverted set forth.

As to the arguments directed to the expression of the MMO genes in *E. coli* for the bioconversion of alkanes, it is noted that even though *E. coli* does not naturally assimilate alkanes, the claims are not limited to the strain, but also include a processed product thereof. Moreover, the transformed *E. coli* strain of West *et al.* can bioconvert the related substrate propene to epoxyp propane, and is transformed with at least 2 of the three genes required. Moreover, Lloyd *et al.*, disclose the bioconversion of methane to methanol with a processed product obtained from *M. trichosporium* (See, e.g., page 461, paragraph 1) and also disclose that the genes encoding for soluble methane mono-oxygenase have been cloned and sequenced. See, e.g., page 462, paragraph 4. Inasmuch as cell-free extracts of the transformed *E. coli* are combined with purified proteins A and C from *M. capsulatus*, one of ordinary skill in the art

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would reasonably have expected that upon the provision of an alkane such as methane it would successfully be bioconverted to methanol by the processed product of *E. coli*. See, e.g., West *et al.*, page 1303, col. 2, "Reconstitution of sMMO activity using recombinant protein B expressed in *E. coli*." Even though applicant argues strenuously that no product-by-process aspect is present, it is submitted that the processed product of the *E. coli* strain can be considered to be claimed as a product by process at least to some extent.

Therefore the rejection is deemed proper and it is adhered to.

No claim is allowed.

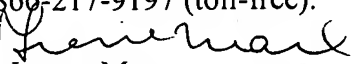
Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Irene Marx whose telephone number is (571) 272-0919. The examiner can normally be reached on M-F (6:30-3:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael G. Wityshyn can be reached on 571-272-0926. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Irene Marx
Primary Examiner
Art Unit 1651